The field of tissue engineering has evolved greatly since the idea of combining active compounds and scaffolds to create artificial tissues. Small molecular weight drugs that control proliferation differentiation of cells can be incorporated into biodegradable scaffolds to induce cellular differentiation and tissue remodeling. The scaffold plays, therefore an important role not only as a physical support but also in the cell proliferation and differentiation.

One of the most important stages of tissue engineering is the design and processing of a porous 3D structure, with high porosity, high interconnectivity between the porous and uniform distribution. A variety of processing techniques have been developed and include solvent casting and particles leaching, compression moulding and particle leaching, thermally induced phase separation, gas-foaming processes, among others. The main disadvantages of these methods are the use of organic solvents and the high temperatures required. The presence of residual organic solvents is being rigorously controlled by international safety regulations, it is necessary to warrant the complete removal and absence of these substances, without exposing bioactive compounds to high temperatures, which may degrade them. Supercritical fluid technology appears, therefore as an interesting alternative to the traditional processing methods.

The unique properties of supercritical fluids have been explored and have led to the development of a number of polymer processing techniques. Regarding tissue engineering and scaffold preparation the most interesting techniques available are impregnation, foaming, phase inversion and foam injection moulding. In this contribution theses techniques will be presented and discussed along with some examples.

(OP 271) Supercritical Fluids: an Emerging Technology for the Preparation of Scaffolds for Tissue Engineering

A.R.C. Duarte[1,2], J.F. Mano[1,2], R.L. Reis[1,2]

[1]3B's Research Group—Biomaterials, Biodegradables and Biomimetics, University of Minho,Campus de Gualtar, 4710-057 Braga, Portugal
[2]Department of Polymer Engineering, University of Minho, Campus de Azurém, 4810-058 Guimarães, Portugal